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Skills Mismatch Elimination as a Method to Raise the Level of Finnish Higher Education

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Abstract

Finland was a leading country in the aspect of higher education. It shaped the technological economy of Finland and resulted in the creation of technology driven companies as Nokia. However, Finland has recently experienced a decline in the level of higher education. The objectives of the thesis were to understand the skills demanded by employers, but not addressed in education so far and to form a base knowledge for the adaptive education adjustment, which would raise the level of higher education in Finland.

The research approach was qualitative. Data was collected through semi-structured interviews with five employers from central Finland. Semi-structured interviews were chosen as primary source of data due to the need of collecting valuable insights from employers.

The results of the study implicated that employers demand field related fundamental literacies, competencies and character qualities. Employers decided that all of the skills groups including fundamental literacies, competencies, character qualities have to be developed during the lifelong learning course. Opinions were split on the topic of online and offline instructions delivery and assessment.

Recommendations based on the study were to include digital metrics in courses to track the ongoing progress of students, organize meetings between students, employers and teacher tutors based on the internship success of the student, form a council which would consist of university, student, and employer representatives which will modify online offering of Open studies according to gathered data. The main limitations of the study were caused by COVID-19 pandemic situation which limited the choice of company representatives.

Keywords (subjects)

Skills mismatch, higher education, adaptive education, Open studies, Finland

Miscellanous

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1 Introduction

1.1 Background

Finland has been an educational gem since the time of independence form Russian Empire in 1917. The quality of education was considered good, and Finnish students generally performed well in international school performance tests. Nearly 60% of the population had completed a secondary education or beyond. (Porter, Sölvell, 2011.) Finland participated in World War II alongside German army which led to payments country had to pay in favor of the winning side. It created challenges for the country to be in the first echelon of technology driven economies. Research and development reforms that were implemented in the 1990s raised inquiry for educated employees. The increasing focus on R&D and technology-intensive activities increased the demand for skilled employees. The government reacted by expanding the capacity of higher education. Between 1993- 1998, the total intake of students in universities nearly doubled, and in polytechnics it nearly tripled. (Porter, Sölvell, 2011.) Rich experience in the field of education eventually led to the development of telecommunications cluster and foundation of Nokia. Universities are continuing to attract talented individuals both Finns and foreigners. Before 2017 Finnish higher education was free of charge for both EU and non-EU nationals. Availability simplified the application process which attracted more students which were not considering higher education outside of their home countries. According to Study in Finland portal there are 35 universities in Finland which provide the whole range of programs both in English and Finnish.

Table 1. U21 Ranking of National Higher Educational Systems 2019 (Leahy, Williams, 2019, 4)

Rank (2019)	Rank (2018)	Country	Score (2019)	Score (2018)
1	1	United States	100.0	100.0
2	2	Switzerland	88.6	88.0
3	3	United Kingdom	84.5	82.6
4	4	Sweden	82.9	82.4
5	5	Denmark	82.5	81.7
6	8	Canada	81.9	79.6
7	9	Singapore	81.3	79.5
8	10	Australia	80.9	78.6
9	6	Finland	80.4	79.7
10	6	Netherlands	80.2	79.7
11	12	Norway	77.8	74.5
12	11	Austria	77.2	75.8
13	13	Belgium	73.6	73.3
14	14	New Zealand	71.5	71.1
15	17	Hong Kong SAR	70.2	67.8
16	15	Germany	69.6	69.2
17	16	France	67.6	68.5
18	18	Israel	67.3	66.3
19	19	Ireland	64.7	64.8
20	20	Japan	61.7	61.9
21	21	Taiwan-China	60.5	60.2
22	23	Saudi Arabia	59.3	57.0
23	22	Korea	57.4	58.0
24	25	Spain	57.3	56.2
25	24	Portugal	56.8	56.4

Rank (2019)	Rank (2018)	Country	Score (2019)	Score (2018)
26	27	Czech Republic	55.2	55.6
27	30	China	54.7	52.4
28	26	Malaysia	54.5	55.7
29	29	Slovenia	53.6	53.6
30	28	Italy	53.4	54.0
31	31	Poland	52.2	51.3
32	34	Chile	51.3	49.0
33	35	Slovakia	49.6	48.7
34	37	South Africa	48.7	47.7
35	36	Hungary	48.5	48.3
35	33	Russia	48.5	49.3
37	32	Greece	47.0	49.5
38	40	Argentina	45.1	44.2
38	38	Ukraine	45.1	47.4
40	39	Brazil	44.1	45.0
41	42	Serbia	43.4	42.8
42	41	Turkey	43.3	44.0
43	45	Croatia	42.1	41.0
44	44	Bulgaria	41.8	42.0
45	43	Romania	41.7	42.2
46	47	Thailand	41.2	40.0
47	46	Mexico	41.1	40.3
48	48	Iran	39.2	38.9
49	49	India	38.8	36.8
50	50	Indonesia	33.5	33.5

However, according to Leahy and Williams (2019) Finland dropped from 6th place in national higher educational systems ranking to 9th place. It is evident that in order to stay within the countries which are technology driven economies, there is a need for implementations.

According to Choudaha and Rest (2018), there are eight megatrends that will be forming the education in the nearest future:

- Aging world: finding new opportunities of education and employment,
- Labour market shifts: increasing automation to affect global workforce,
- Skills mismatch: gap between what employers demand vs. what education provides,

- Rapid urbanization: shift towards cities in search of jobs and career advancement,
- Stricter immigration policies: more barriers for mobility to high-income destinations,
- Economic shifts: dependence on emerging markets for economic growth,
- Capacity imbalance: demand in emerging economies vs. supply in developed economies,
- Budget pressures: higher education is facing decline in public funding.

All of the above megatrends are of value to the research, but the one that has the stronger connection is skills mismatch.

According to World Economic Forum and Boston Consulting Group (2015) there are three groups of skills that students acquire. They are foundational literacies, competencies and character qualities. Students vary in these skills according to their cultural background, age, and life experience. Adaptive learning is a method that is able to lower the skills mismatch.

Existing solutions in the higher educational institutions in Finland are represented by open university option. The goal of open universities is to offer everyone equal opportunities to develop their abilities, to improve their level of education and to retrain for a new career. They are also the ideal way to become eligible for pursuing a typical university degree afterwards. (Pop, 2019.) However, Open University in United Kingdom struggles due to budget shortages recently. In the OU's first year of teaching in 1971, some 24,000 students enrolled; by the end of the 1980s, more than 100,000 graduated. In 2008-2009, 193,835 students were registered at the Open University, paying £1,400 for full-time tuition each year. But when the tuition fees surged to £9,000 in 2012, 168,210 students enrolled – and the numbers keep plummeting. In the most recent academic year, student enrolment dropped to 122,000. (Varghese, 2018.) It represents the decline in demand for a higher education degree even at the lower price according to competing universities. Open

University of United Kingdom is the first open university established in the world and it has always been a benchmark for other higher institutions. While the OU was one of the first institutions to offer e-learning, in 1999, it now shares the marketplace with numerous MOOCs (Massive Open Online Courses). Often free or much cheaper than the OU's yearly tuition fees, they are offered by more than 800 universities around the world, including Harvard and MIT. (Varghese, 2018.)

As the gatekeepers of knowledge and stewards of human capital, universities have to play a major role in preparing a skilled global workforce. Doing so will require an ecosystem-oriented mindset, using online offerings to extend reach and establish partnerships with other universities and content providers. For that matter, it will require much greater investment than the 3% of overall expenditure currently allocated to technology in the education sector. Much like industries, universities will need digital solutions to solve for the big problems in higher education. (Belsky, 2019.) Finland has been a country with technology driven economy, since it started investing in higher education. Current situation states that there is a need for a new digital solution that will raise the level of educational content and attractiveness of higher education institutions. The proposition will be to develop an adaptive learning platform that will be modified yearly by the university council.

1.2 Motivation for the research

The audience for whom this research will be useful are education policy makers and higher education institutions of Finland, for example, ones that form FINNIPS. Finnish Network for International Programmes (FINNIPS) is a cooperation network formed by 10 Finnish Universities of Applied Sciences (UAS). These Universities of Applied Sciences offer over 40 degree programmes that are fully conducted in English. The majority of the UASs' degree programmes are at Bachelor's level but there are also several Master's programmes to choose from. (What is FINNIPS?, 2009.)

Currently 70 percent of people in jobs where the future of their career, profession, or industry is uncertain. We find that 9.6% (8.0%) of the current US and UK workforce is in an occupation that will very likely experience an increase in workforce share and

18.7% (21.2%) in an occupation that will very likely experience a fall. These estimates imply that a large mass of the workforce in both the US and UK have highly uncertain demand prospects (that is, a probability of experiencing a higher workforce share of close to 50:50). (Bakhshi, Downing, Osborne, & Schneider, 2017.) The demand for lifelong learning projects will escalade in the nearest future. Adaptive learning project investments could help Finland prepare for the mass unemployment caused by automation.

1.3 Research objective and questions

The objectives of the research are to investigate the main skills where employers demand and education provision mismatch, gather and assess qualitative data, and form a base knowledge to initiate development of adaptive learning project and, consequently, raise level of provided education.

The research problem: limited course choice and digital supply in open universities of higher education institutes raises skills mismatch and restrains applicants from recruitment opportunities.

The research has one main research question:

- How may skills mismatch between employers' demand and higher education institutions supply be decreased?

The research aims to analyze gap between existing offerings in the open university in JAMK University of Applied Sciences and employers' demand by conducting a qualitative research using a questionnaire interview with the Finnish companies. This will shape the fuller understanding and will provide more precise results.

1.4 Structure of the thesis

Structure of the thesis will include introduction chapter where the topic, problem and objectives will be introduced. Furthermore, it continues with the literature review chapter where key concepts, definitions and theoretical framework will be

provided. Afterwards, there is methodology chapter including research approach, research context, data collection, data analysis, and verification of the results. Results chapter provides findings of the research. Discussion chapter answers to the related questions, practical or managerial applications, assessment of the results in the light of literature, limitations of the research, and recommendations of the research will be provided.

2 Literature review

2.1 Education

Education is the process of teaching or learning, especially in a school or college, or the knowledge that you get from this (Meaning of education in English, n.d.). The two important aspects of education relative to the research are: face-to-face learning and distant learning. According to the University of Birmingham Education is a human response to the challenges we all face. We invest billions of pounds and years of lives in education. Education does not only take place in schools, but in families, communities, places of work. Students, graduates, and researchers are shaping the world we live in. (What is Education?, 2017.)

Face-to-face learning can be defined as the traditional style of learning in which you show up at a venue at the same time for a number of sessions. You will be taught or tutored by an instructor or teacher, following a prescribed schedule of taught sessions called a curriculum. (Cooper, 2018.) Face-to-face is expected to suit best, when student has time to participate in a classroom. The traditional classroom or face-to-face instruction is when the instructor and the students of a nonprofit educational institution are in a place devoted to instruction and the teaching and learning take place at the same time. In this setting all performances and displays of work are allowed.

Requirements:

1. All materials must be legally acquired.
2. Teaching activities must take place in a classroom or a similar place devoted to instruction. (Face-to-Face Instruction, 2018.)

Taking into consideration that face-to-face method of communication is the richest in terms of information transferring, face-to-face learning method may be highly valuable if applicable to the student's possibilities.

Distance learning is also known as online learning, e-learning, open learning or learning from home. You may pay for the course upfront and receive all the materials in one shipment or you may pay monthly with some providers, with course materials released as you complete (and pay) for modules or units. Distance learning is possibly one of the most flexible study options open to the modern student, irrespective of their age, working status and so on. You do need to commit to your course, which means understanding the difference between flexibility and 'not really bothering'. If you don't have a strong sense of discipline or are not interested in forming one when it comes to your studies, distance learning may not be for you. (Cooper, 2018.) By harnessing emerging technologies, universities can reach beyond campus walls to empower diverse learners at global scale. It begins with embracing stackable, online learning, which provides flexibility and affordability that increases access to university curricula and allows students to engage in smaller chunks of learning before committing to larger degree programs. Technology-powered formats like mobile-friendly experiences meet the learner where they are, enabling more seamless transitions for those entering a new learning environment or picking up where they left off. At a more advanced level, embracing AI-powered adaptive learning will enable universities to personalize education for millions for more effective outcomes. (Belsky, 2019.)

2.2 Adaptive learning

Adaptive education is a method of teaching and learning in which the teaching mechanism (typically a digital platform) adapts to the learner. While tests have

already been developed that become more or less difficult depending on the participants' answers, adaptive teaching in the learning environment is used for more than assessment. (Travers, 2017.) Adaptive learning is a method in education through which specific teaching devices or instruments are employed in an effort meet the specific learning needs of individuals. In other words, adaptive learning is personalized learning. Through the use of advanced technologies tools, instructors can transform traditional, broad-based learning into precision learning. (Romaniuk, 2017.) Many interesting adaptive educational hypermedia systems have been developed and reported since 1996. An interest to provide distance education over the Web has been a strong driving force behind these research efforts. The introduction of the Web has impacted both the number and the type of systems being developed. All the early systems were essentially lab systems, built to explore some new methods that used adaptivity in an educational context. (Brusilovsky, 2001.)

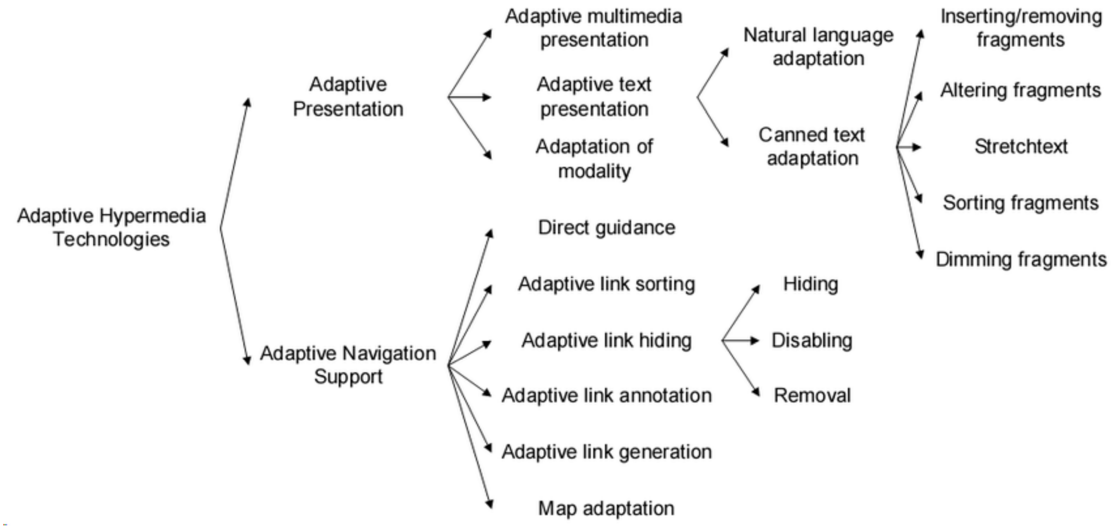

Figure 1. The updated taxonomy of adaptive hypermedia technologies (Brusilovsky Adaptive Hypermedia, 2001)

Adaptive education was previously considered as methods of teaching children with special conditions. Currently, it is mostly associated with adaptable teaching in the field of E-Learning. First, students take tests which assesses their knowledge. Second, adaptive technology adapts the program for the student according to the previous knowledge.

Adaptive hypermedia technologies scheme (Fig. 1) represents the ways of adapting educational materials to the end customer.

2.3 Lifelong Learning

Lifelong Learning is an ongoing process of education which aims to attract to learning individuals who have left the education system and the ones who will enter it (Dewey, 1997). Therefore, Lifelong Learning seeks to appeal to as many people as possible.

Lifelong learning is the development of human potential through a continuously supportive process which stimulates and empowers individuals to acquire all the knowledge, values, skills and understanding they will require throughout their lifetimes and to apply them with confidence, creativity and enjoyment in all roles, circumstances, and environments. (Davies, Longworth, 1996, 22.)

Lifelong learning is a concept that integrates a wide variety of learning formats and is usually seen as education throughout the lifetime. Lifelong learning activities can happen in a formal context (organized by an educational institution), it can happen outside an educational institution (nonformal), or it can happen accidentally without previous planning (informal). Any purposeful learning activity undertaken on an ongoing basis targeted at the increase of knowledge, skills, and competences can thus be seen as lifelong learning. (Kalz, 2015.)

The benefits of the concept are that Lifelong Learning does not only enhance personal development, but also self-sustainability, competitiveness and employability.

2.4 Open University

Open University is the university which format is based on no or little entry requirements. It allows students to gain knowledge at the comfortable time and atmosphere. Distance education is the concept which mainly associated with open universities, since there is frequently minimal need to attend the university physically.

The term open university usually refers to a university with an open-door academic policy, i.e. no entry requirements. That is why open universities are usually “open” to all students. The initial thought behind open universities was to make higher education accessible for everyone. For example, this means that you might be accepted even when you do not have a certificate from secondary school. You might go through a screening process, but there are no high standard entry requirements. On top of that, open universities have specific services for disabled persons and for people studying at a home/workplace at their own time and pace. (Pop, 2019.)

There are no basic educational requirements or age limits for Open University studies. Studies at the Open University are suitable for various purposes, including:

- Maintaining professional skills,
- Spending a gap year productively,
- Launching a new career,
- Learning about different disciplines,
- Experiencing the joy of learning and gaining new insights.

The Open University designs the studies so that students can complete them while working. Many courses can also be completed online as distance studies. There are no age limits or previous education requirements. (What is the Open University?, 2018.)

The term distance learning is used as a synonym for the more comprehensive and precise term distance education. The rationale for distance education from its earliest days has been to open opportunity for learners to study regardless of geographic, socio-economic or other constraints. The use of the term open is intended to highlight this key feature of the theory and practice of distance education. Distance education is any educational process in which all or most of the teaching is conducted by someone removed in space and/or time from the learner, with the effect that all or most of the communication between teachers and learners is through an artificial medium, either electronic or print. (Moore, Tait, 2002, 23.)

Open University is an educational institution that provides an opportunity for everyone to learn regardless of their geographical location or previous experience. Selection process exists; however, it is not severe.

The most famous example of the Open Universities is located in Great Britain. It is called Open University (OU) it was founded in 1969 by the Queen. It is a virtual open study university, which has around 200 000 students. It makes it the biggest university in Great Britain. OU is located in Milton Keynes, UK, but it also has several regional centers across the world.

2.5 Skills Gap

To thrive in a rapidly evolving, technology-mediated world, students must not only possess strong skills in areas such as language arts, mathematics and science, but they must also be adept at skills such as critical thinking, problem-solving, persistence, collaboration and curiosity. All too often, however, students in many countries are not attaining these skills. (World Economic Forum, Boston Consulting Group, 2015.)

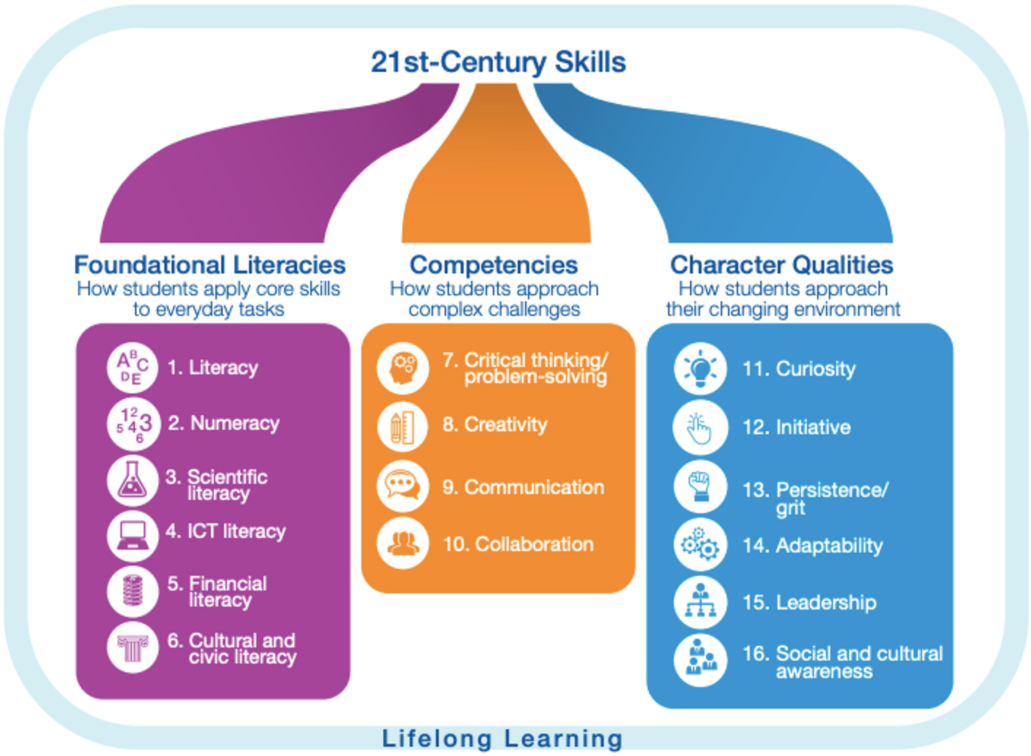

Figure 2. 21st-Century Skills (World Economic Forum, Boston Consulting Group 2015)

The importance for people to be always learning throughout their career, the importance of collaborating, of working as parts of teams, developing those higher order cognitive skills, where you can interpret, analyze, make connections between seemingly different pieces of information, and persuade others of your argument, that you can provide good service and insight, that you can emphasize, and care, and be concerning of others. These are skills that are going to be in greater demand than ever. (Bakhshi, Downing, Osborne, & Schneider, 2017.)

In terms of the employment in the future, skills are something that will be of a higher value than gained knowledge, since it requires foundational literacies, competencies and character qualities to form an overall professional.

Delivering on the potential of technology to address skills gaps will ultimately require effective collaboration among a complex and interconnected group of policymakers,

educators, education technology providers, and funders. Among other actions, stakeholders can do the following:

- Assess and realign education systems and standards for the development of twenty-first-century skills,
- Develop and promote technology expertise among teachers,
- Develop products to fill gaps in twenty-first-century skills measurement and instruction,
- Provide funding to pilot, transfer, and scale up technology-enabled models. (Bailey, Kauffman, & Subotic, 2015.)

These points depict the algorithm of actions for the topic of skills gap. Most importantly they represent the need for technological expertise improvement and funding in the environment of educational institutions.

2.6 Employment

Employment is an agreement between an employer and an employee that the employee will provide certain services on a job. The employment agreement ensures that:

- The work will occur in the employer's designated workplace, which can be from a telecommuter's home,
- The work is designed to accomplish the employer organization’s goals and mission,
- In exchange for work performed, the employee receives compensation.

An employment agreement for an individual employee can be a verbal exchange, written email, or job offer letter. The offer of employment can be implied in an interview or written in a formal, official employment contract. (Heathfield, 2019.) "Employment" is not a simple term denoting the mere holding of a job for which a wage is paid, or the operating of one’s own business. Rather, it signifies the state of

anyone who is doing what, under the circumstances, he most wants to do. Such a person is fully "employed." A community or nation has "full employment" when all of its people are fully employed. (Cooley, 1963.) An employee is an individual who was hired by an employer to do a specific job. The employee is hired by the employer after an application and interview process results in his or her selection as an employee. This selection occurs after the applicant is found by the employer to be the most qualified of their applicants to do the job for which they are hiring. (Heathfield, 2019.)

In human resource management, “recruitment” is the process of finding and hiring the best and most qualified candidate for a job opening, in a timely and cost-effective manner. It can also be defined as the “process of searching for prospective employees and stimulating and encouraging them to apply for jobs in an organization”. (Luenendonk, 2016.) Recruitment is the end-to-end process of effectively and efficiently sourcing, screening, selecting, and appointing the best-suited candidate to the right role. This entails not only filling in vacancies but also predicting talent requirements and proactively managing talent. (Ghosh, 2019.)

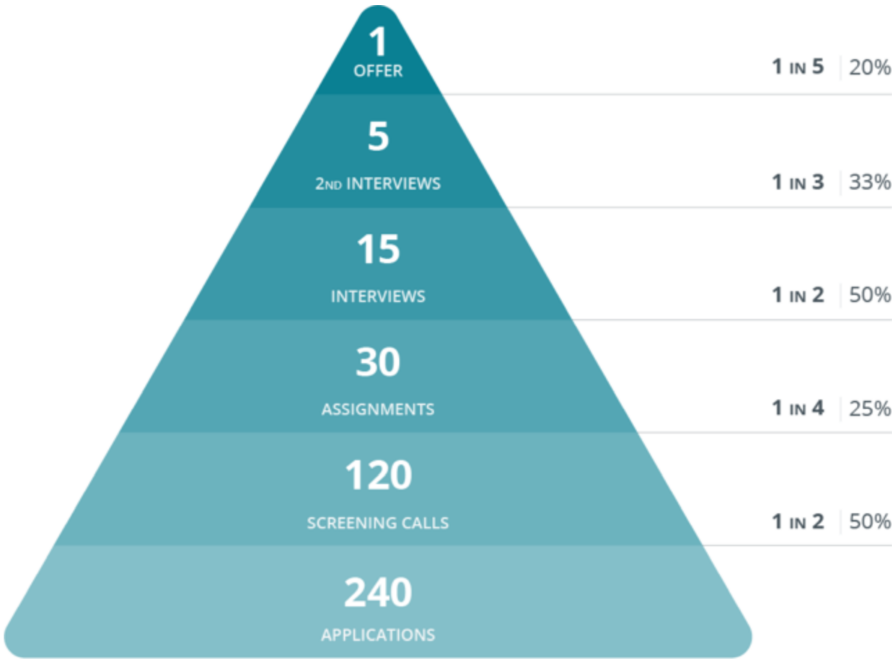

Figure 3. Recruiting Yield Pyramid (Bika, n.d.)

Yield ratios show what percentage of candidates pass from one stage of the hiring process to another (Bika, n.d.). According to example from two hundred and forty applications there will be one offer.

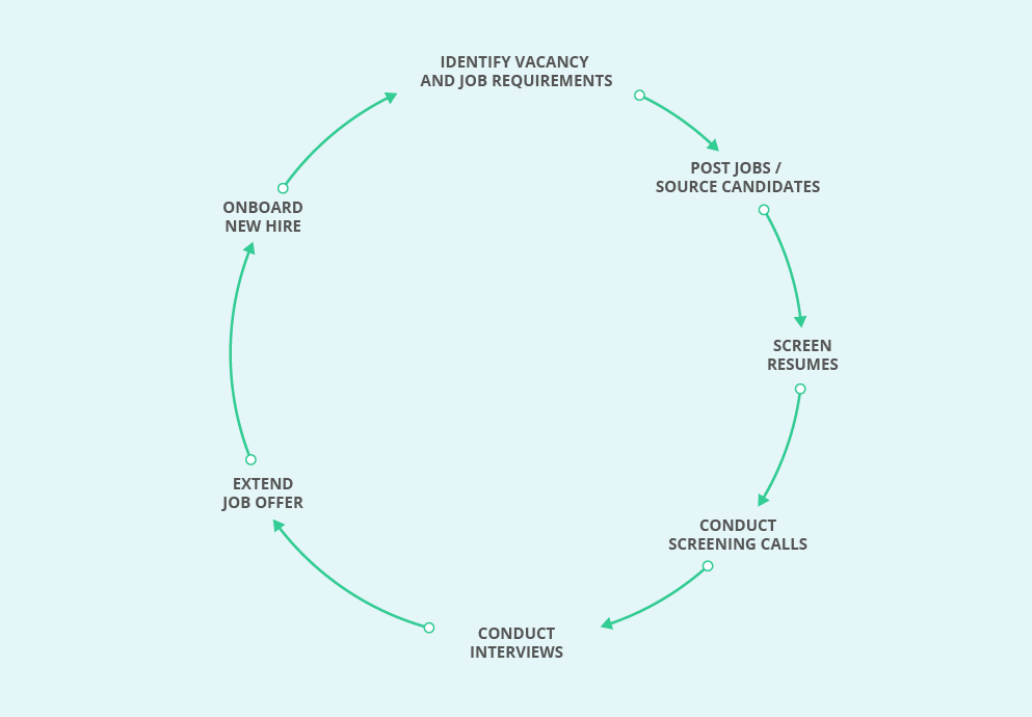

Figure 4. Recruitment Cycle (Bika, n.d.)

Full cycle recruiting refers to the entire recruiting process. The term is often used to describe a recruiter or HR person who can complete every step: a full cycle recruiter.

Those steps might include:

- Taking the hiring manager's job requisition
- Developing a clear job description and identifying must-haves and nice-to-haves for the new hire
- Placing a listing for the role on job boards, advertising the opening on social media, or sourcing candidates
- Screening candidates and preparing the hiring manager to interview them
- Presenting an offer to finalists and negotiating its details with them
- Preparing the hire to start the job. (Recruiting Social, 2016.)

E-recruitment, or online recruitment, refers to using the web, software and other technology to attract, find, evaluate and hire people. Online recruiting methods include:

- Sourcing candidates on professional social media.
- Using an applicant tracking system (ATS.)
- Interviewing candidates online via video interviewing software. (Bika, n.d.)

Employment accompanied by recruitment are constantly changing fields which are formed in relation to market requirements. Job market is formed from the skills and not from the professions.

2.7 Theoretical framework

Closed loop is an industrial system that was chosen as the theoretical framework for the research.

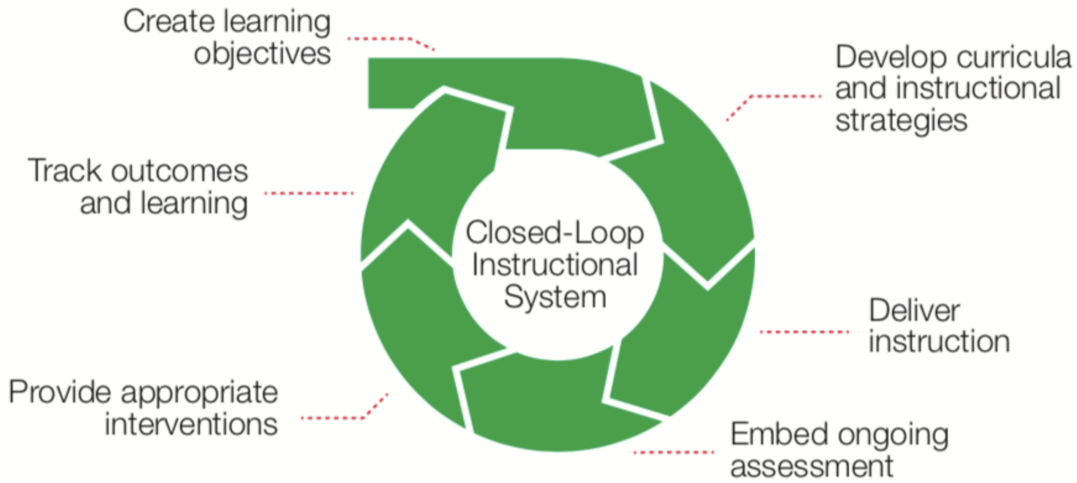

Figure 5. Closed Loop (Boston Consulting Group, World Economic Forum, 2015)

The first category includes instructional resources that help address 21st-century skills gaps through the design, delivery and assessment of learning. These include personalized and adaptive content and curricula, open educational resources, communication and collaboration tools and interactive simulations and games. The second category includes institutional resources that help the closed loop deliver outcomes by improving human capital development and strengthening management

systems. These include digital professional development resources for teachers and student information and learning management systems. (Boston Consulting Group, World Economic Forum, 2015.)

- Creating learning objectives stands for identification of the existing skills gap and gathering appropriate information for the course,
- developing curricula and instructional strategies is structuring the frequency of learning and finding mentoring plan that would correlate with the needs of the student,
- delivering instructions is an actual realization stage of the mentoring plan when a student is exposed to the instructions and materials,
- embedding ongoing assessment is the implementation of the consistent student success tracking,
- providing appropriate interventions stands for making changes in the materials or instructions corresponding to the student's feedback,
- tracking outcomes and learning is an analytical phase where student and mentor comprehend the results of learning.

This framework will be used to form questions for interview questions. Employers will provide their view regarding each aspect of the adaptive course creation in relation to the working demands.

Their replies will provide understanding of the skills mismatch and routes for minimizing it. Therefore, usage of the closed loop model will provide understanding regarding digitalized steps that would lead to creation of adaptive courses that would lower the skills gap.

3 Methodology

3.1 Research approach

The research has one main research question:

- How may skills mismatch between employers' demand and higher education institutions supply be decreased?

The research approach is qualitative. Qualitative research is expressed in words. It is used to understand concepts, thoughts or experiences. This type of research enables you to gather in-depth insights on topics that are not well understood. (Streefkerk, 2019.) Conducting one-on-one interviews is one of the most common qualitative research methods. One of the advantages of this method is that it provides a great opportunity to gather precise data about what people think and their motivations. (Radu, 2019.) The research aimed at gathering valuable insights from employers regarding skills mismatch, since the topic is not well comprehended. Therefore, completing a qualitative research through the semi-structured interviews suits the research question.

The research aim is an exploratory research**.** Exploratory research aims to explore the main aspects of an under-researched problem (McCombes, 2019). Skills mismatch is an under researched issue accompanied by adaptive education in terms of higher education in central Finland. The research seeks to raise awareness and cause action in central Finland.

3.2 Research context

Distance learning is a way of learning remotely without being in regular face-to-face contact with a teacher in the classroom (Midgley, n.d.). Distance learning students use internet and web interfaces to access course contents and provide their answers for further assessment. Remote students use distance learning as a convenient method for studying due to their geographical location, financial status, full-time employment.

Finland is located in Northern Europe between Sweden and Russia. Finland transformed from a farm/forest economy to a diversified modern industrial economy; per capita income is among the highest in Western Europe. A member of

the EU since 1995, Finland was the only Nordic state to join the euro single currency at its initiation in January 1999. In the 21st century, the key features of Finland's modern welfare state are high quality education, promotion of equality, and a national social welfare system - currently challenged by an aging population and the fluctuations of an export-driven economy. (The World Factbook: Finland, 2020.)

Figure 6. Location of Finland (The World Factbook: Finland, 2020)

3.2.1 JAMK University of Applied Sciences

JAMK University of Applied Sciences is an international higher education institution with expertise in 8 different fields of study.

JAMK has several campuses in the city of Jyväskylä and a campus in Saarijärvi. City of Jyväskylä is located in Central Finland. (JAMK Information, n.d.)

JAMK has an offering of online courses which is sorted by fields of study.

ICT:

- Android Application Development, 5 ECTS;
- Mobile Application Development, 5 ECTS;
- New and Emerging Technologies, 5 ECTS (Master's level).

Languages and Communication:

- Writing Academic English, 5 ECTS.

Culture:

None.

Business:

- Business Analytics: Prescriptive Models, 5 ECTS;
- Corporate Finance Models 1, 5 ECTS;
- Corporate Finance Models 2, 5 ECTS;
- Dynamic Creativity Management, 3 ECTS;
- Ethics and Law for International Managers, 3 ECTS;
- Formulating Strategy, 5 ECTS (Master's level);
- Game, Art & Design, 3 ECTS;
- Global Destination Branding, 3 ECTS;
- Global Financial Management, 5 ECTS;
- Global Sales Management, 5 ECTS;
- Global Supply Chain Management, 5 ECTS;
- Global Team Leadership, 3 ECTS (Master's level);
- Intellectual Property Law and Contract Law, 5 ECTS;
- International Business Study Path 2, 34 ECTS;
- International Business Speaking, 3 ECTS;
- Music and Sound for Games, 5 ECTS;
- Psychology for Business Management, 3 ECTS;
- Responsible Management, 5 ECTS (Master's level);
- Sport Marketing, 5 ECTS;
- Statistics for Managers Using MS Excel, part 1, 5 ECTS;
- Statistics for Managers Using MS Excel, part 2, 5 ECTS;

Natural Resources and the Environment:

- Farm Scale Energy Production from Solid Biofuels, 3 ECTS;
- Sources and Potentials of Different Biomass By-products, 4 ECTS;

Tourism and Hospitality:

- Asian Incoming Tourism, 5 ECTS;
- Cultural Tourism, 5 ECTS;
- Destination Development, 5 ECTS (Master's level);
- Electronic Customer Services, 5 ECTS;
- Food tourism, 5 ECTS;
- Future Technology in Tourism, 5 ECTS;
- Nature Based Tourism, 5 ECTS;
- Safety and Security in Hospitality, 5 ECTS;
- Sport Tourism, 5 ECTS;
- Sustainable Nutrition, 5 ECTS;
- Tourism Management Study Path 1, 29 ECTS;

Social Services and Health

- Multicultural Work in Social and Healthcare Services, 5 ECTS;
- Professional Ethics, 5 ECTS (Master's level);
- Sexual Health Promotion and Human Rights (YAMK), 5 ECTS.

Technology

- 3D Modelling CATIA V6, 3 ECTS;
- Purchasing, 5 ECTS (Master's level);
- Purchasing, 5 ECTS;
- Sustainability and Responsibility, 3 ECTS.

3.3 Data collection

Primary data for this research was collected by doing five semi-structured interviews with business owners in the central Finland and a lecturer from the higher education institution. The interviews were gathered through the use of digital communication tools. The employers operating in Central Finland were chosen to represent companies' needs in terms of employment. In addition, similarity of the university processes and employers' processes was compared.

Research has been done in the COVID-19 pandemic situation, therefore, many employers refused to participate in relation to their business struggles. Participants were willing to collaborate and provide valuable insights only under the condition of confidentiality of the research. All participants were informed about the confidentiality of the interview. They were named as Employer 1, Employer 2, Employer 3, Employer 4, and Lecturer.

Interviews were conducted in English, since that is the only language all of us share. The semi-structured interview was chosen due to the topic of the research. It involves many related aspects and valuable insights. Therefore, structured interview could miss important information. Since semi-structured interviews combine both the structured and unstructured interview styles, they can offer the advantages of both. They allow for the objective comparison of candidates, while also providing an opportunity to spontaneously explore topics relevant to that particular candidate. (Pollock, 2019.) Semi-structured interviews are superbly suited for a number of valuable tasks, particularly when more than a few of the open-ended questions require follow-up queries. Especially consider employing semi-structured interviews in the following situations:

- If you need to ask probing, open-ended questions and want to know the independent thoughts of each individual in a group;
- If you need to ask probing, open-ended questions on topics that your respondents might not be candid about if sitting with peers in a focus group;
- If you need to conduct a formative program evaluation and want one-to-one interviews with key program managers, staff, and front-line service providers;
- If you are examining uncharted territory with unknown but potential momentous issues and our interviewers need maximum latitude to spot useful leads and pursue them. (Hatry, Newcomer, & Wholey, 2015.)

The interviews were chosen as a primary source of data due to the need of independent opinions of key managers in the process. Interviewees form central

Finland were chosen to get valuable insights into this region. Therefore, by using interviews region specific questions were focused on.

The interviews were recorded and transcribed so that detailed data covered in them would not get lost. The questions for the semi-structured interview are in the "Appendices" -chapter.

3.4 Data analysis

For this research Excel was used to organize data by using codes for different elements of the closed loop model. This allowed to filter elements and easily organize them. The variables used in the data analysis were create learning objectives (CLO1, CLO2, CLO3, CLO4), develop curricula and instructional strategies (DCIS1, DCIS2, DCIS3), deliver instructions (DI1, DI2, DI3), embed ongoing assessment (EOA1, EOA2), provide appropriate interventions (PAI1, PAI2, PAI3), track outcomes and learning (TOL1, TOL2, TOL3), propositions (P). For measuring data similar data from interviewees was searched for to compare the results. Table below represents the division of variables.

Table 2. Variables.

Code of the variable	**Variable**	**Definition of the variable**
CLO1	Key skills	Key skills assessed on the workplace
CLO2	Fundamental literacies	Value of literacy, numeracy, scientific literacy, ICT literacy, financial literacy, cultural and civil literacy in a company
CLO3	Competencies	Competence ranking of critical thinking/problem solving, creativity, communication, collaboration
CLO4	Character qualities	Impact of curiosity, initiative, persistence/grit, adaptability, leadership, social and cultural on employment
DCIS1	Curricula	Choice between personalized and standard curricula

DCIS2	Skills groups	Role of fundamental literacies, competencies, character qualities in course development
DCIS3	Digital resources	Role of digital resources in course development
DI1	Face-to-face/online instructions	Choice between face-to-face and online instructions delivery
DI2	Individualized/groups instructions	Choice between individualized and group instructions delivery
DI3	Mentoring	Mentoring in instructions delivery
EOA1	Contact/online assessment	Choice between contact and online assessment
EOA2	Progress assessment	Means of progress assessment
PAI1	Feedback	Feedback gathering
PAI2	Mentoring meetings	Frequency of mentoring meetings
PAI3	Success	Border success percentage
TOL1	Progress data	Use of gathered progress data
TOL2	Digital tools	Use of digital tools in outcomes tracking
TOL3	Outcomes tracking adjustments	Means of adjusting outcomes tracking
P	Propositions	Propositions on how to enable communication of students, universities and employers to enable efficient work of the elements of the closed loop model.

Coding is a way of indexing or categorizing the text in order to establish a framework of thematic ideas about it (Gibbs, 2007).

The qualitative data analysis was done first by transcribing the interview and the questionnaire into written form. Afterwards, key phrases were labeled and then

coded. It allowed to focus on the elements of closed loop model. Later, parts of the text which were about the elements of the closed loop were organized.

3.5 Verification of the results

Internal validity

Internal validity is the extent to which you are able to say that no other variables except the one you are studying caused the result (Boyd, 2013).

Conducted semi-structured interview linked theoretical framework with research questions. Thus, received results suit the framework. Therefore, qualitative data results connect theoretical framework to discoveries.

External validity

External validity asks the question of generalizability: To what populations, settings, treatment variables, and measurement variables can this effect be generalized? (Campbell, Stanley, 1963.)

The research was made on the skills gap context in terms of central Finland. This means that results are limited to the geographical and cultural contexts making them challenging to adapt to other contexts. Nevertheless, closed loop model has proven to be efficient in many contexts of education.

Reliability and objectivity

Reliability refers to how consistently a method measures something. If the same result can be consistently achieved by using the same methods under the same circumstances, the measurement is considered reliable. (Middleton, 2019.)

The term triangulation refers to the practice of using multiple sources of data or multiple approaches to analyzing data to enhance the credibility of a research study (Salkind, 2010).

The research follows these terms, since there are numerous different sources which all have consistent results. All of the five interviews were transcribed. Findings enhance each other and provide valuable insights. They do not conflict with one another.

Other researchers should receive similar results. Interviewees are operating employers in central Finland. They constantly deal with interns and trainees that come from the universities. Lecturer that was interviewed for an educator point of view is a full-time employee at JAMK. These people work in the field every day and there may be no more reliable source of information.

4 Results

The results chapter consists of six segments based on the closed loop model: create learning objectifies, develop curricula and instructional strategies, deliver instructions, embed ongoing assessment, provide appropriate interventions, track outcomes and learning.

4.1 Create learning objectifies

Respondents were asked to answer questions regarding learning objectives on three major skills groups which are fundamental literacies, competencies, character qualities.

Main skills that are assessed by respondents when they employ new people for a job, included various ideas regarding their companies. Overall respondents mentioned experience and education as key skills when choosing an applicant for a job.

> *Most important is to learn new things independently, but it is also quite difficult to assess. When a student comes from the university, he/she does not have skills needed at work. Student should learn those skills and I do not have time to teach those skills or neither my colleagues have time to teach those skills. So, it means that students should learn it by themselves. And there are big differences how people learn skills independently. It is really close to the term internal entrepreneur. In addition to that it is very important to have basic IT skills. Communication skills are also very important.* (Respondent Employer 2.)

Some respondents highlighted ability to learn independently and growth mindset as major aspects when selecting an applicant. It reflects the general trend of flattering of organizations. Employers expect workers to take responsibility upon their projects and actions.

> *We made questionnaires to employers on what they expect from BBA students. And mostly the skills that are needed are teamworking, other general working skills. Self-leadership is also important. Therefore, employee can take responsibility of his/her own duties and participate in teamwork at the same time. Organizations become flatter that is why there is a demand for self-leadership.* (Respondent Lecturer.)

JAMK lecturer indicates team-working and self-leadership as skills that organizations have stated through the questionnaires. He/she admits the trend for self-leadership, and it interconnects with independent learning and responsibility taking mentioned by some of the employers. It also follows the statement about growth mindset, since leadership has strong relation with goal setting.

> *I think…the we value all of those literacies: literacy, numeracy, scientific literacy, ICT, financial, cultural and civil literacy. If I had to pick, I would pick ICT and cultural literacy, since we are in the IT field and we value proper communication because our employees work with clients also.* (Respondent Employer 1.)

Respondents mainly value ICT literacy and cultural and civil literacies. Respondents justify it with a fact that not only they work with digital systems, but they also work with clients, therefore, communications skills are essential. Being digital is one of the skills that all of the respondents require. Some of them mentioned that they do not

have time to teach some of the systems they are using. People that are willing to work should study those digital systems themselves. As from the respondents' point of view it reflects the motivation of the employee.

Communication skills are also of high priority, since respondents work straight with end customers. Consequently, they take responsibility on company brand image from the way they communicate to customers. Therefore, ability to clearly articulate main messages of the company to the customer is highly valued.

> *Critical thinking/problem solving is the most important. Next important competence is communication. Communications is more important than collaboration, although those are close terms, because in small companies we have to communicate to customers as well. Third most important will be collaboration because we do a lot of things by ourselves in a group. And least important is creativity. It is important, but very often we do routine tasks, and if there is something where we need creativity, we normally have brainstorm sessions and this way there are ideas from a lot of people.* (Respondent Employer 2.)

Regarding character qualities such as curiosity, initiative, persistence/grit, adaptability, leadership, social and cultural awareness and their role in the company they were all highly rated. From the respondents answers it is evident that they search for required competencies when they are in the process of employment. Communication is valued due to the fact of importance of communication to end customer. It is also valued because of internal communication which shapes company working environment and productivity.

Collaboration is valued when respondents have big projects which involve successful cooperation of different departments. Employers state that achieving of a goal relies on a group productivity. Therefore, collaboration or team-working skills are essential.

> *Let us say we are a big company. Initiative, persistence and grit are essential, since most off the initiatives come from the bottom. It takes certain efforts to have those initiatives driven and since IT is a very developing industry. Things are changing weekly. People have to adapt*

> *to it, and we realize that not all the people adapt quick. Therefore, adaptability is very important as well. As for a big company social and cultural awareness are definitely important as well. (*Respondent Employer 3.)

Employer 3 makes emphasis on the initiative, since they are listening to all of their employees if they have an innovative idea on how to raise the level of work. Adaptability is also mentioned in the important skills, due to the consistently changing environment.

> *I think people account more on the experience and not on the character qualities. They are very difficult to measure. In Finland you have to have good grounds when you employ. You have to have well-defined arguments. Therefore, people might get in trouble if they employ based on character qualities. Sometimes people go through psychological tests. However, employers do not make junior personnel go through psychological tests. Work experience is more important than school. On the other hand, experience does not necessarily guarantee professionalism. (*Respondent Lecturer.)

Most of the respondents mentioned initiative and persistence as major character qualities of an employee. Some mentioned curiosity as an important character quality, also. Some mentioned that character qualities are not that important as work experience, which is highly valued, since character qualities are difficult to measure.

4.2 Develop curricula and instructional strategies

Most of the respondents do not care whether the curriculum is adaptive or standard. For instance, Employer 3 stated that personalized adaptive curricula or standard curricula does not matter. Some of the employers mentioned that they would prefer adaptive curriculum.

It can be associated with the fact that employers focus mainly on the result and do not quite understand the educational process and the way this information should be delivered. The general statement respondents made were that the result is what matters. If a person studies better with adaptive curriculum, it should be adaptive. If a person studies better with standard curriculum, it should be standard.

Commonly, respondents were stating that all of the skills groups, including fundamental literacies, competencies, character qualities have to be developed during the course. Employer 4 stated that competencies, character qualities, fundamental literacies all have to be developed during the course. Lecturer mentions that they are creating competencies, alongside fundamental literacies. However, they are also moving towards developing character qualities. He thinks all of those should be developed during the course.
All of the respondents are wishing to find best overall professionals when they employ. That is why they wish to have an employer that developed at least some skills of the three skills groups.

Most respondents mention that they do not use a lot of digital tools at work. They commonly use communication tools, marketing tools and CRM systems. We use Teams as a communication tool. We, for example, run websites on Web Press and so on… We also have marketing related tools and CRM systems. (Respondent Employer 2.)

Respondents also mentioned the willingness to expand their digital capacity in terms of the used tools. They are wishing to establish a more digital environment at work due to efficiency increase.

4.3 Deliver instruction

Regarding online and offline instructions delivery, opinions split. Some of the employers prefer face-to-face instructions delivery. Face-to-face. Basically, we show user accounts then ask employees to learn them and then use them. In case there are some challenges, I can help. (Respondent Employer 2.) Some of the employers prefer digital channels of instructions delivery. We create online team channels. (Respondent Employer 3.)

Respondents look for the direct instructions delivery if they have a chance to provide instructions face-to-face, they choose this option. If email is the most direct of the official channels, they use email or another digital tool. The main concern is that they wish their message to be heard and understood. It does not matter whether it will be online or offline, if the message is comprehended.

Respondents mainly choose group or individual instructions delivery based on the project. If it is an individual project, they deliver instructions individually and if it is a group project, they deliver instructions in groups. Depends on the instructions. If it's a group than a group etc. (Respondent Employer 3.) Some of the respondents prefer groups for the convenience.

> *I like to do it in groups, this way I do not have to do it many times. I prefer to use the discussion forum in optima so that students can ask their questions there. Therefore, when I answer a question there everyone else will see it there as well. Students can surely write me emails, but discussion forum is much more efficient.* (Respondent Lecturer.)

Regarding group instructions delivery, respondents may choose this method for convenience. It lacks comprehension, since communicating to a group is worse than communicating to an individual.

I think that mentor should be in this (delivery of instructions) process. When an employee has struggles, he/she should be able to receive help from someone. (Respondent Employer 1.)

> *The role of a mentor will be…(to explain) why do we use some tool (digital), how do we use this tool, explain the big picture and maybe…the mentor tells here you can find instructions how to study the program. After that employee has to learn this tool by him/herself independently. Of course, if an employee finds some challenges then he/she can ask from the mentor. The role of a mentor is to explain and motivate an employee to learn.* (Respondent Employer 2.)

All of the respondents agree that mentor is essential in terms of instructions delivery. Some of the employers articulate the need of a mentor in terms of a struggle, while some see a role of a mentor in motivating an employee during the first steps of the project. Respondents mention that mentors in terms of facilitators are very valuable and essential for companies, especially when a new employer enters the company.

4.4 Embed ongoing assessment

I prefer contact assessment of performance. Personal contact takes always less time and less problems with misunderstanding. (Employer 1.)

> *We have a structured form where employee looks at what he/she has achieved for the past period and looking forward. Employee and a mentor review and discuss those forms after they are filled. Promotions, rewards and penalties are also depending on these forms.* (Respondent Employer 3.)

Generally, employers prefer contact assessment due to little misunderstanding. Some of the employers have a combination of assessments online and offline. Metrics are gathered online and used as a basis for contact meetings.

Employers commonly evaluate work of their employees based on their goal achievement. Some employers monitor the work of their employers in person together with communicating with customers and asking feedback. We assess progress of an employee by the set goals. (Employer 2.)

4.5 Provide appropriate interventions

We listen to our employees when they address us some questions. We are always open to it. We do not have annual feedback forms…It is something we should definitely include in the future. (Respondent Employer 1.) One-to-one meetings and anonymous feedback forms which are done yearly which gathers reviews from managers. (Respondent Employer 3.)

Employers commonly provide an atmosphere where employees can openly share their feedback in contact. Some of the employers also gather online anonymous feedback from personnel.

Normally, employers organize mentoring meetings once a week. Some of the employers organize mentoring meetings once a month. Mentoring meetings occur weekly. (Employer 2.)
Some of the respondents organize mentoring meetings once during the project to realize the progress of the project. Some employers conduct monthly and annual meetings.

Respondents do not have a general border percentage rate of success. If projects or goals are not fulfilled, there is a need for adjustment. In sales, if we do not achieve our goals it may trigger the adjustment. Also, employees provide feedback from customers. It could also come from the developer saying that we have problems with something. (Respondent Employer 2.)

4.6 Track outcomes and learning

Mentor data is generally used by respondents to decide on promotions and penalties. We use progress data for promotions and penalties. (Respondent Employer 3.) Some of the respondents use it for adjustments. We read it and we discuss it, but sometimes those forms are unreliable. (Lecturer.)

Some of the respondents use progress data for improvement of the existing activities. They realize goals and if they realize that goal would not be completed, they organize a meeting to understand the situation.

Respondents state that digital tools should be used for gathering feedback and organizing mentoring meetings. For being basis for one-to-one meetings (Respondent Employer 3.) For gathering information about the course. (Respondent Lecturer.)

Respondents commonly state that tracking the outcomes should be adjusted in terms of expanding to other departments apart from sales/marketing. We have formulized it (adjustment of outcomes tracking) mainly on sales data, and we definitely have to use some other metrics as well. For instance, tools for R&D people. (Employer 2.)

Some of the respondents expressed the need for digitalizing tracking the outcomes. Therefore, they wish to be able to comprehend the need for adjustment faster.

4.7 Propositions

Generally, respondents mentioned the need for implementing more digital metrics to organize the tracking progress in a more efficient manner.

> *First of all, it (collaboration between students, universities and employers) should be done, since that is the only way we may ensure that JAMK teaches the right skills. One way of doing this is to improve internships. When there is a student who comes to internship to a company and then at the same time there should be a meeting where would be participant from JAMK who is responsible for the curriculum and a representative from the company. They could have a discussion on how the student has performed based on what was learnt at JAMK, and what should have been studied at JAMK. In that meeting discuss and find what should be changed in the curriculum or in the processes of JAMK so that student would have skills that are needed for work.* (Respondent Employer 2.)

Some of the respondents mention that these meetings should be based on the internship of the students. Meetings between internship student, teacher tutor and an employer should provide a basis for the higher counselling meeting which would decide later on the course contents in terms of creating learning objectives, developing curricula and instructional strategies, delivering instruction, embedding ongoing assessment, providing appropriate interventions, tracking outcomes and learning.

> *It is very important; they should work together. Of course, in terms of students, they can evaluate the different kind of things than employers. Students may not be the best source in terms of what should be studied. We have invited managers for a meeting to ask what kind of skills, what kind of challenges they have. We did it once. We were supposed to do this again, again and then nowadays, since than we have not been able to meet. We are very busy, and they are also very busy. We really had a good discussion, managers who came they really liked the discussion, too. But we had never been able to do that again. One challenge is that students, teachers and employers are all very busy. It would be great to have those people together to discuss and collaborate on how to develop.* (Respondent Lecturer.)

Most of the respondents state that efficient collaboration between students, universities and employers will be achieved through conducting meetings. These meetings were advised to occur once in six months or more frequently.

5 Discussion

5.1 Objective and summary

The objectives of the research were to examine skills that employers demand, but universities are unable to provide, gain knowledge through literature and qualitative data. Also, shape a knowledge base for an adaptive learning project, which would, consequently, raise the level of education. The research question was: how may skills mismatch between employers' demand and higher education institutions supply be decreased? This question was answered by interviewing main process actors – employers and a lecturer. The main finding was that this could be done through meetings where related skills and future actions could be discussed.

The results of this study represent that employers demand appropriate field related fundamental literacies. Employers highly value all the competencies: critical thinking/problem solving, creativity, communication, collaboration. Furthermore, majority of the participants value character qualities very high when they employ.

This study has shown that, concerning curricula, opinions divided, it does not matter for 2 participants, 1 believes it should be based on a person, and 2 stated that

adaptive curricula is better. Therefore, we may conclude that employers mostly choose adaptive curricula over standard. Participants agree that all skills groups including fundamental literacies, competencies and character qualities have to be developed during the course.

This study has found that generally instructions delivery is done both online and offline, in groups and individualized. Participants want the communication to be as direct as possible. They all think that the role of a mentor is very important in the process of delivery instructions.

Ongoing assessment is usually done offline or in a combination of online and offline tools. Most of the participants try to assess the work done by employee offline. Meetings are gathered based on goal fulfillment. Participants are deciding on promotions of the employee based on the outcomes tracking. Participants use digital tools and are wishing to integrate even more tracking tools as adjustment. Contributors wish to gather more feedback, also.

5.2 Managerial implications

The findings of this study have a number of important implications for future practice. The progress of students in higher education institutions should be monitored within a course. It could be done using digital metrics of learning management system. It will allow to make changes within a course to increase the level of education.

Another important practical implication is that the university should initiate forming a council which will consist of university representatives, student representatives and an employer side representatives. This council should decide on the course contents in relation to the feedback of involved groups. This council should be responsible for Open study courses at first, since they are more modifiable.

Council meetings should be based on the internship meetings. After student completes his/her internship an internship meeting should happen between a student, teacher tutor, and internship supervisor. They discuss the progress of a student during his/her internship and decide on the changes in the learning objectifies, developing curricula and instructional strategies, delivering instructions, embedding ongoing assessment, provision appropriate interventions, tracking outcomes and learning.

These changes should affect Open study courses to form an adaptive education environment which will form an up-to-date digital choice for Lifelong learning.

5.3 Comparison with earlier literature

Similarly to the findings of the present study, earlier study from Lavonen (2020) state that one of the challenge in Finnish education is society-level challenges: number of young people dropping out of school or from the labor market and an increase in inequality; the influence of digitalization, such as artificial intelligence and automation, on the education sector; the need for continuous training of adults to reflect the changes in working life, like digitalization; and the need to support sustainable development. It represents the issue that many employers face with trainees when they come to work.

According to Bakhshi, Downing, Osborne, and Schneider (2017) top ten skills in the 2030 employment would be:

- Learning strategies,
- Instructing,
- Social perceptiveness,
- Coordination,
- Active learning,
- Speaking,
- Service orientation,

- Active listening,
- Complex problem solving,
- Judgement and decision-making.

Lavonen (2020) lists ten competencies from the National Core Curriculum:

Ways of thinking:

- Critical thinking,
- Creative thinking,
- Learning to learn,

Ways of working:

- Inquiring,
- Problem solving,
- Communication and collaboration,

Tools for working:

- Information literacy,
- Technological skills, media literacy,

Acting in the world:

- Global and local citizenship,
- Cultural awareness and social responsibility.

Similar findings were achieved in this study, since employers demand for a number of these skills and competencies. Employers wish these competencies are developed in their employees. Previous studies represent the way of reducing the skills gap between education supply and employers demand at country level. Therefore, it is recognizable that we received similar results.

5.4 Limitations of the research

Main limitation of the study was that due to COVID-19 pandemic situation in the world, Finnish employers were reluctant to collaborate due to business struggles. It prolonged the interviewing process. Even though the study was narrowed by geographical location of central Finland, it could also be suitable to many developed globalized countries.

The reliability of the data was ensured by using various employers to provide triangulation of data. Results were in line with opinions of interviewees making them more reliable. The latest studies, also, reflect the same opinion on skills gap and the ways of minimizing it.

5.5 Recommendations for future research

Further research in this field would be of great help in the area of STEM (science, technology, engineering, and mathematics) professions. It could make the transition of labor easier and less stressful. Future research could be done based on the managerial implications. Employers could be divided by fields of operation and not by the geographical location.

Future research could study more ways of successful collaboration between students, universities and employers to find out new solution for the issue of skills gap.

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Appendices

APPENDIX 1: Interview questions for company owner 1:

Create learning objectives:

- What are the key skills you assess when you choose an applicant for a job?
- How are fundamental literacies valued in your company? (Literacy, numeracy, scientific literacy, ICT literacy, financial literacy, cultural and civil literacy)
- Please rate the list of competencies from 1 (least) to 5 (most): critical thinking/problem solving, creativity, communication, collaboration?
- What role in terms of employment do character qualities such as curiosity, initiative, persistence/grit, adaptability, leadership, social and cultural awareness play in your company?

Develop curricula and instructional strategies:

- What would you prefer for your employee: personalized adaptive curricula or standard curricula?
- What skills groups (fundamental literacies, competencies, character qualities) have to be developed during the course?
- How do you use digital resources in your company, for instance, personalized adaptive content, open educational resources, communication and collaboration tools, interactive simulations and games?

Deliver instruction:

- How do you deliver instructions face-to-face or online and why?

- How do you deliver instructions: individualized, in groups or both and why?
- How do you assess the role of a mentor in the process of delivering instructions?

Embed ongoing assessment:

- Which type of assessment of performance do you prefer to use: online or contact, and why?
- How do you assess progress of an employee?

Provide appropriate interventions:

- How do you gather ongoing feedback from personnel? (Small Group Instructional Diagnoses, surveys, webQs, open-ended feedback forms)
- How frequently mentoring meetings occur in your company?
- What is the border success percentage that represents the need for adjustment?

Track outcomes and learning:

- How mentors use gathered progress data?
- How should digital tools, such as personal learning plan, be used to track outcomes?
- In your opinion, how could tracking the outcomes be adjusted?

Additional Questions:

- How could students, universities and employers communicate to provide efficient collaboration on creating learning objectives, developing curricula

and instructional strategies, delivering instruction, embedding ongoing assessment, providing appropriate interventions, tracking outcomes and learning?